

Measuring and Combatting the Negative Economic Impacts of Coronavirus

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Abstract

I present evidence on the economic impact of Covid-19 under four headings:

1. Aggregate stock market reactions
2. Forward-looking business surveys
3. Covid-induced economic uncertainty
4. Covid-19 as a reallocation shock

I draw on some of the evidence to sketch (partial) arguments for policy conclusions in two areas:

- The U.S. government should invest more heavily in forward-looking surveys of business activity (among other innovations in data collection and statistical output). These surveys are especially valuable for quantifying forward-looking uncertainty and for assessing the near-term and medium-term future effects of large, extraordinary shocks like the coronavirus pandemic.
- Several government policies will inhibit an efficient and speedy reallocation of jobs, workers and capital in reaction to the coronavirus pandemic. These include overly generous unemployment benefit levels under the CARES Act, policies that encourage employee retention irrespective of the employer's medium-term business outlook, state-level occupational licensing restrictions, and regulatory impediments to business formation and expansion.

Acknowledgments

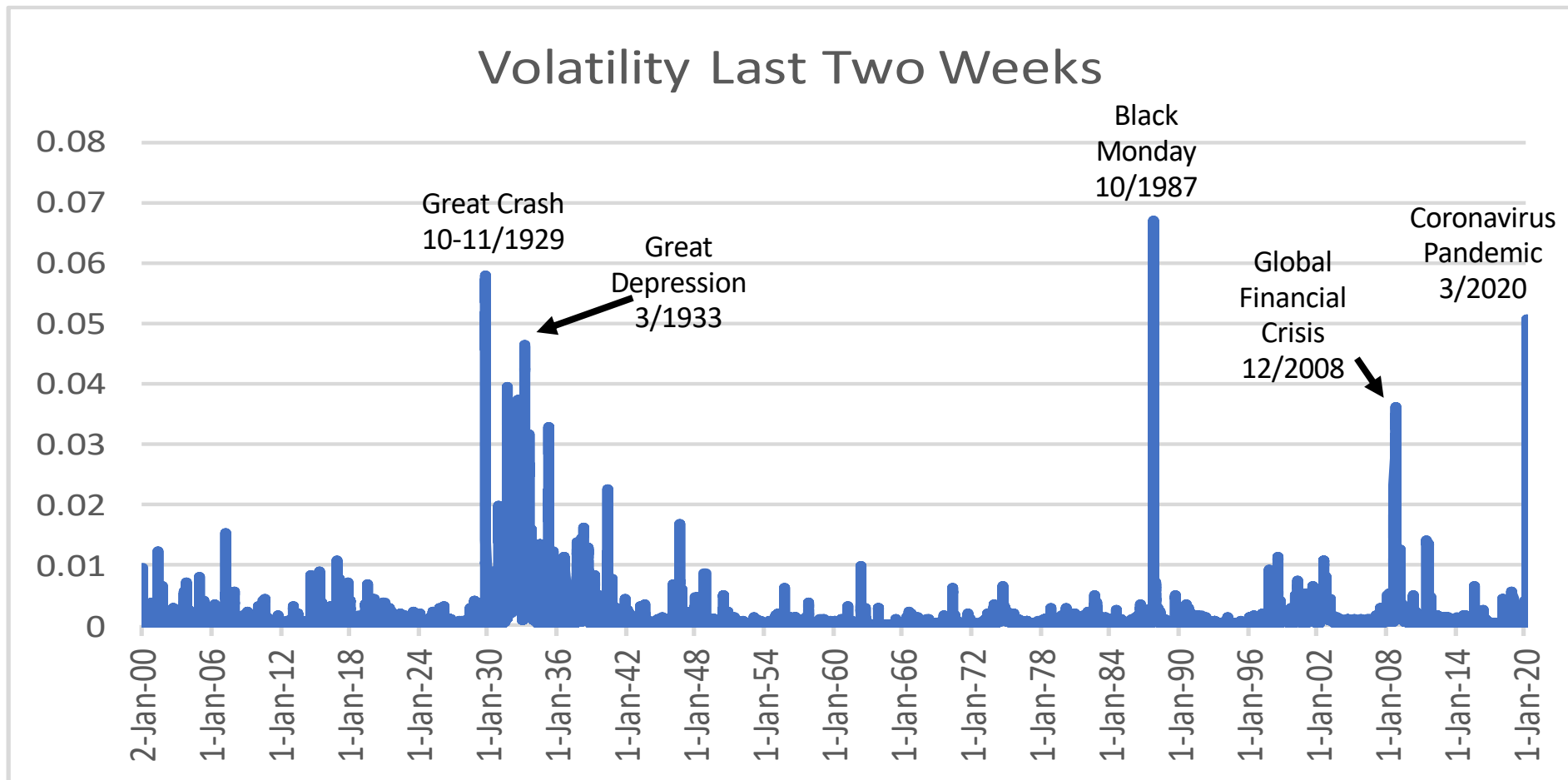
This presentation draws on my work with many collaborators: David Altig, Scott Baker, Jose Maria Barrero, Nick Bloom, Kyle Kost, Dingqian Liu, Brent Meyer, Emil Mihaylov, Nick Parker, Marco Sammon, Xugang Simon Sheng, Stephen Terry, and Tasaneeya Viratyosin.

I owe a large debt to my collaborators. Mistakes and misstatements are my own.

Aggregate U.S. Stock Market Reactions

Drawing on Baker, Bloom, Davis and Kost (2019), Baker, Bloom, Davis and Sammon (2019), and Baker, Bloom, Davis, Kost, Sammon and Viratyosin (2020).

Figure 1. Realized U.S. Stock Market Volatility, January 1900 to March 2020



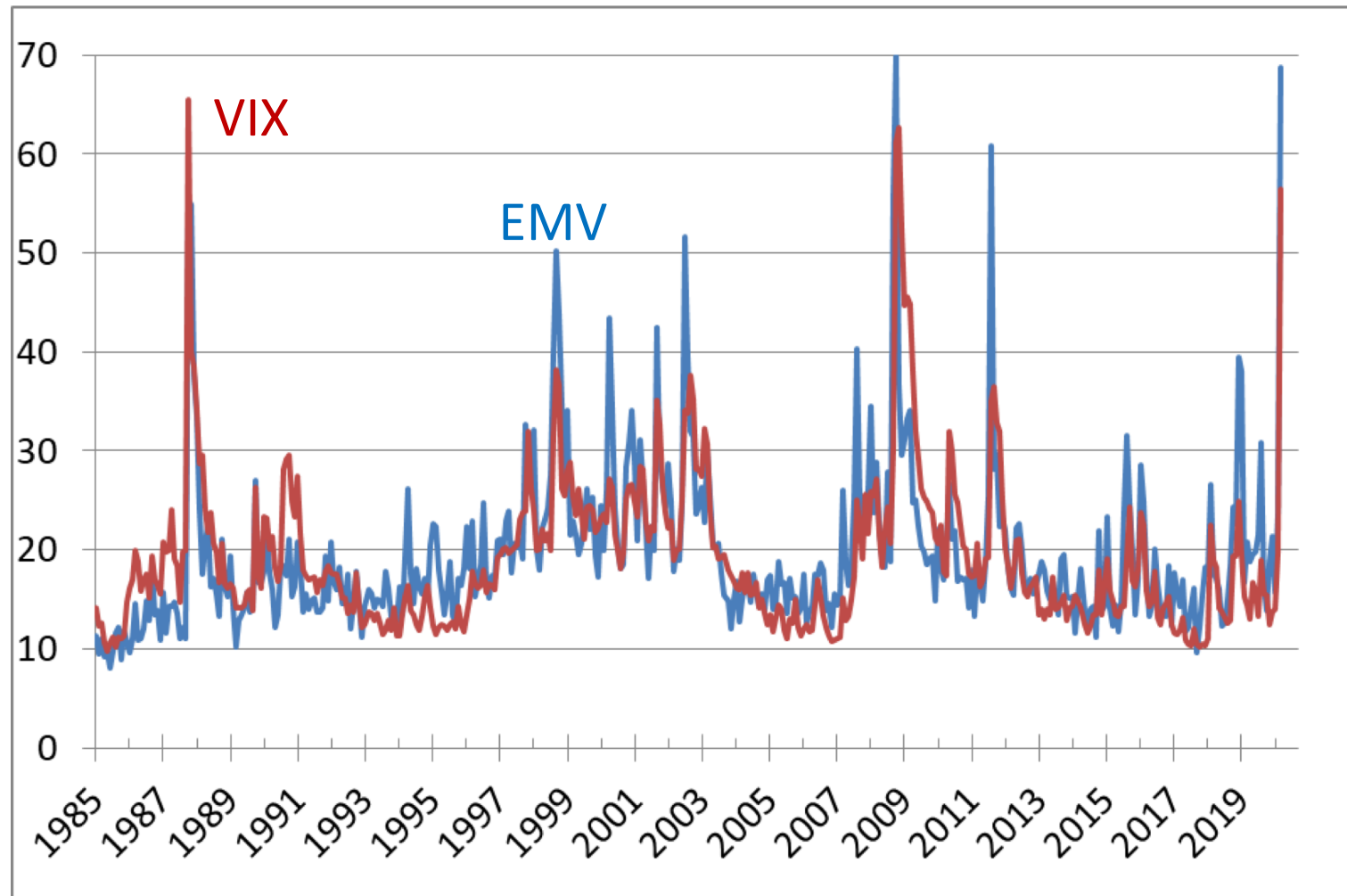
Notes: Sample period, 1/1/1900-3/23/2020. From 12/1925-Present, returns are computed using Yahoo Finance's 'adjusted close' series for the S&P 500 (^GSPC). Before that, returns are from the Global Financial Data extension of the Dow Jones Index. Volatility last two weeks is the sum of squared returns over the past 10 trading days.

Table 1. The Unprecedented U.S. Stock Market Impact of the Coronavirus

	Number of Daily U.S. Stock Market Jumps Greater than 2.5%	Number Attributed to Economic Fallout of Pandemics	Number Attributed to Policy Responses to Pandemics
2 January 1900 to 21 February 2020	1,116	0	0
24 February 2020 to 24 March 2020	18	7.4	8

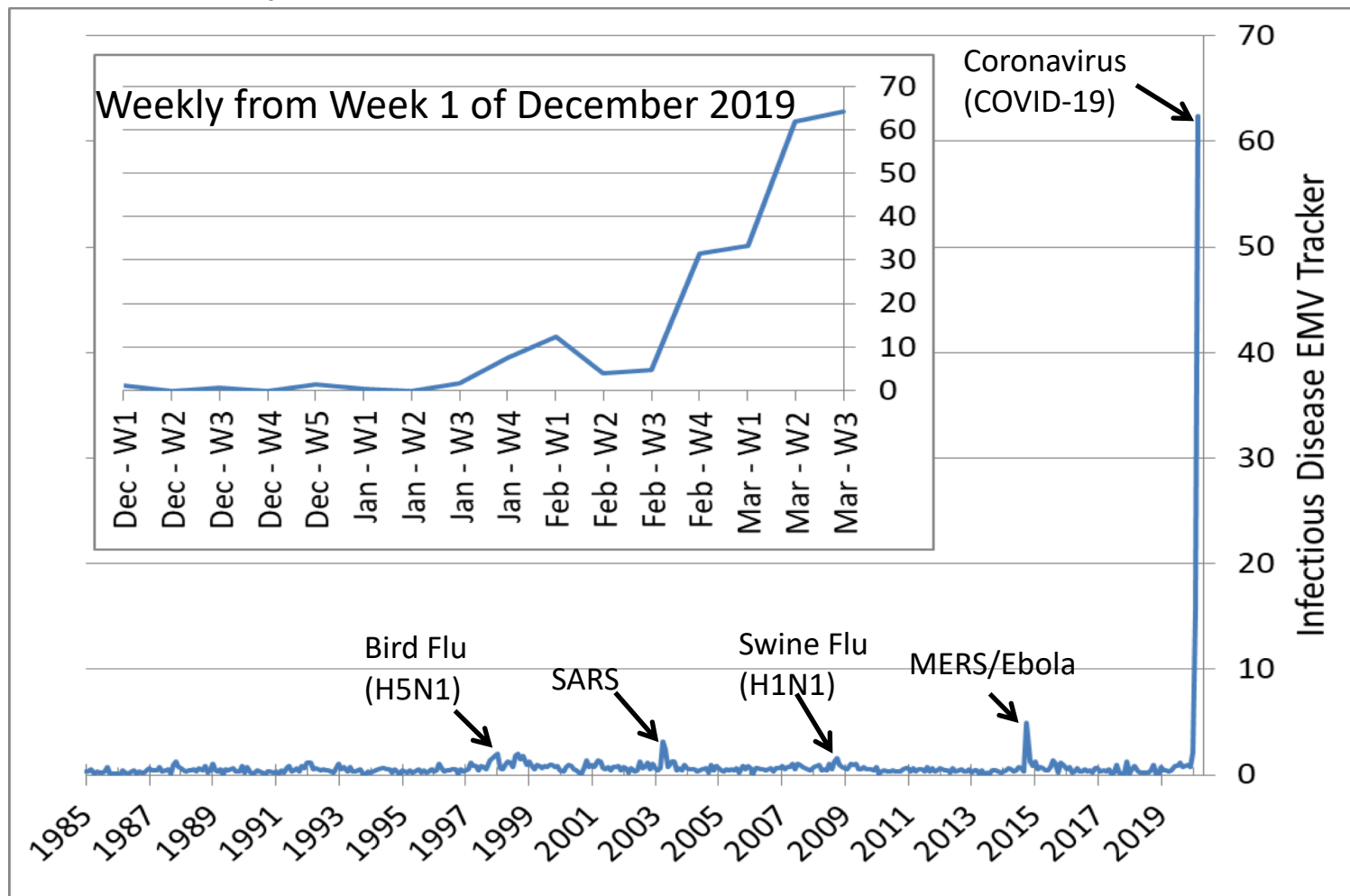
Note: Tabulated from results in Baker, Bloom, Davis and Sammon (2020), who consider all daily jumps in the U.S. stock market greater than 2.5%, up or down, since 1900. They classify the reason for each jump into 16 categories based on human readings of next-day (or same-evening) accounts in the *Wall Street Journal* (and *New York Times* in 2020). Fractional counts arise when newspapers differ in their jump attribution or human readers differ in their classification of the attribution. Number Attributed to Economic Fallout of Pandemics includes jumps on 3/12 and 3/16 that a subset of coders classified as Macroeconomic Outlook. It's clear from reading these articles that the journalist regarded the deterioration in the Macroeconomic Outlook as due to the spread of the coronavirus.

Figure 2. Newspaper-Based Equity Market Volatility Tracker and the 30-Day VIX, January 1985 to March 2020



Notes: The Equity Market Volatility Tracker reflects the frequency of articles about stock market volatility in leading U.S. newspapers, as quantified by Baker, Bloom, Davis and Kost (2019). The 30-Day VIX is constructed as the monthly average of daily closing VIX values collected from Yahoo Finance. March 2020 reflects data through March 20th.

Figure 3. Infectious Disease EMV Tracker, Weekly and Monthly Data from 1985 to March 2020



Notes: The Infectious Disease EMV Tracker is computed as the overall EMV tracker value multiplied by the share of EMV Articles that contain one or more of the following terms: epidemic, pandemic, virus, flu, disease, coronavirus, mers, sars, ebola., H5N1, H1N1. March 2020 data includes through March 20th.

Notes on Constructing a Newspaper-Based Equity Market Volatility (EMV) Tracker and an Infectious Disease EMV Tracker

EMV Tracker: Five steps: (1) For each of 11 leading U.S. newspapers, get monthly counts of articles that contain at least one term in each of three sets:

- **(E)conomy**: {economic, economy, financial}
- **Stock (M)arket**: {"stock market", equity, equities, "Standard and Poors", "Standard & Poors", "Standard and Poor", "Standard and Poor's", "Standard & Poor's"}
- **(V)olatility**: {uncertain, uncertainty, volatility, volatile, risk, risky}

(2) Scale these counts by the number of all articles in the same paper and month. (3) Standardize the scaled frequency counts to have unit standard deviation over time for each paper. (4) Average the standardized, scaled frequency counts over newspapers by month. (5) Multiplicatively rescale the resulting average series to match the mean level of the VIX from 1985 to 2015.

Infectious Disease EMV Tracker: Calculate

$$\left(\frac{\# \{E \cap M \cap V \cap \mathbf{ID}\}_t}{\# \{E \cap M \cap V\}_t} \right) EMV_t,$$

where # denotes the count of newspaper articles in the indicated set, EMV_t is the value of our overall EMV tracker in month t , and **ID** is the following set:

- **(I)nfectious (D)isease**: {epidemic, pandemic, virus, flu, disease, coronavirus, mers, sars, ebola, H5N1, H1N1}

See [Baker, Bloom, Davis and Kost \(2019\)](#) for more information.

Why have COVID-19 developments exerted such powerful effects on the U.S. stock market since late February?

1. Severity of pandemic, ease with which virus spreads, and non-negligible mortality rate among those who contract the virus. Spanish flu comparison suggests this answer is highly incomplete.
2. Information is better and diffuses much more rapidly now than a century earlier. But Spanish Flu had modest impact on U.S. stock market even over weeks and months (Velde, 2020).
3. Importance of face-to-face interactions in business and personal services and interconnected nature of modern economies (long-distance travel and, in Europe, cross-border commuting; decades of falling communication costs, falling transport costs and, until recently, falling tariffs; dense, spatially expansive supply chains; ubiquity of just-in-time inventory systems; etc.)
4. Behavioral and policy reactions to the pandemic: Current Containment efforts are more extensive and widespread than similar efforts in the past, including during the Spanish Flu, leading to a sudden and massive reduction in the output of goods and services. Voluntary adoption of social distancing practices has also played a significant role.

The behavioral and policy reactions sketched in 4 have potent effects for reasons sketched in point 3. Work in progress by Davis, Liu and Sheng (2020) shows much milder pandemic responses for the Chinese stock market.

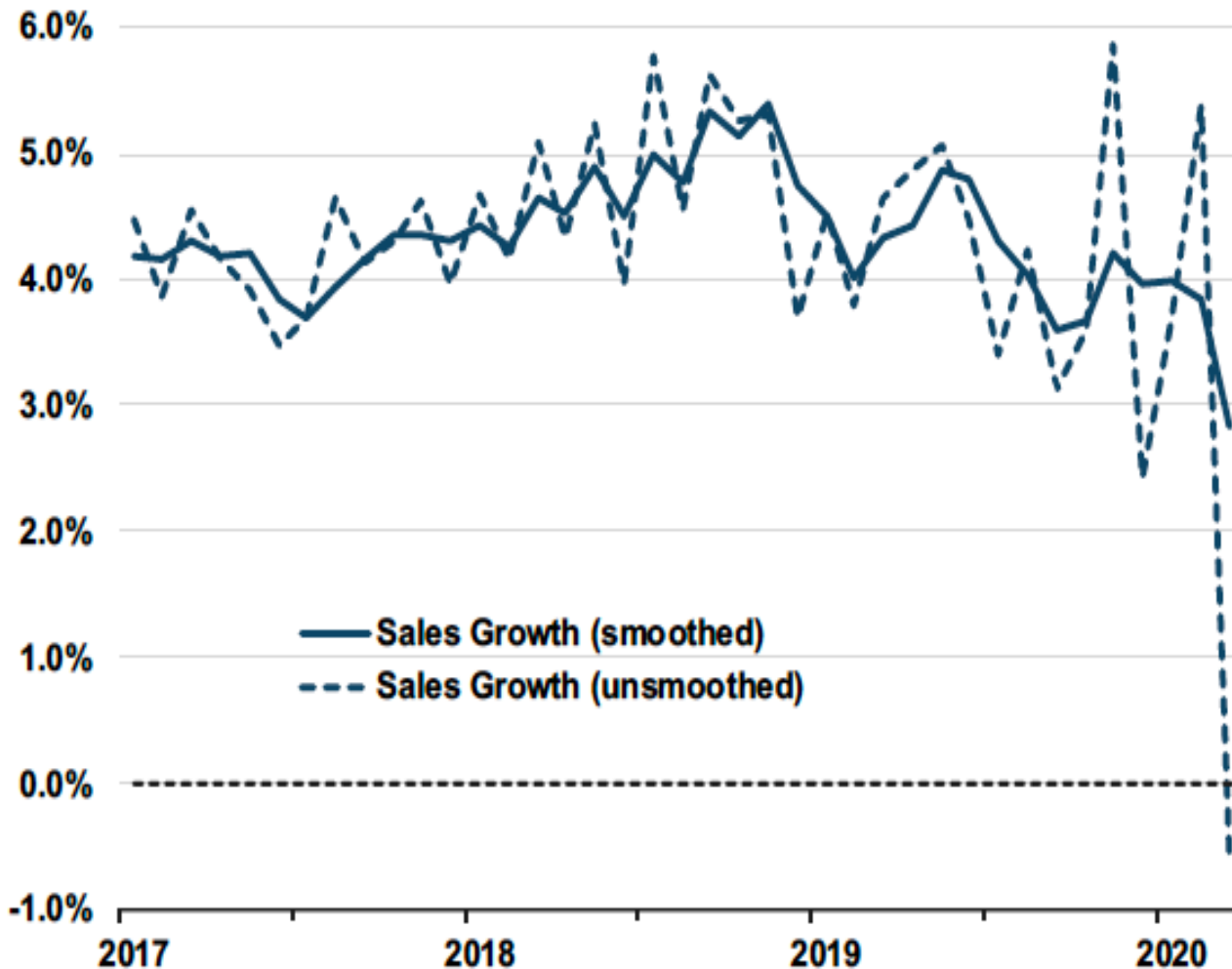
Forward-Looking Survey Evidence

Drawing on Altig et al. (2020a,b) and Bloom et al. (2019).

Sales Growth Rate Expectations at a Four-Quarter Look-Ahead Horizon, January 2017 to March 2020

Sales Growth Rate Expectations

Percent changes from current to four quarters hence



Notes: Based on data from the Survey of Business Uncertainty (SBU) conducted by the Atlanta Fed, Chicago Booth and Stanford. For information about the SBU and analysis of the underlying micro data, see Altig et al. (2020a). This chart is reproduced from Altig et al. (2020b).

Anticipated Coronavirus Impact on 2020 Sales Revenues, Percentage Amounts

Survey of Business Uncertainty (March 9-20, 2020)

What is your best guess for the impact of coronavirus developments on your firm's sales revenue in 2020? (Response options are a respondent-supplied percentage amount, up or down, and no effect.)

Anticipated Coronavirus Impact on Own Sales Revenues in 2020

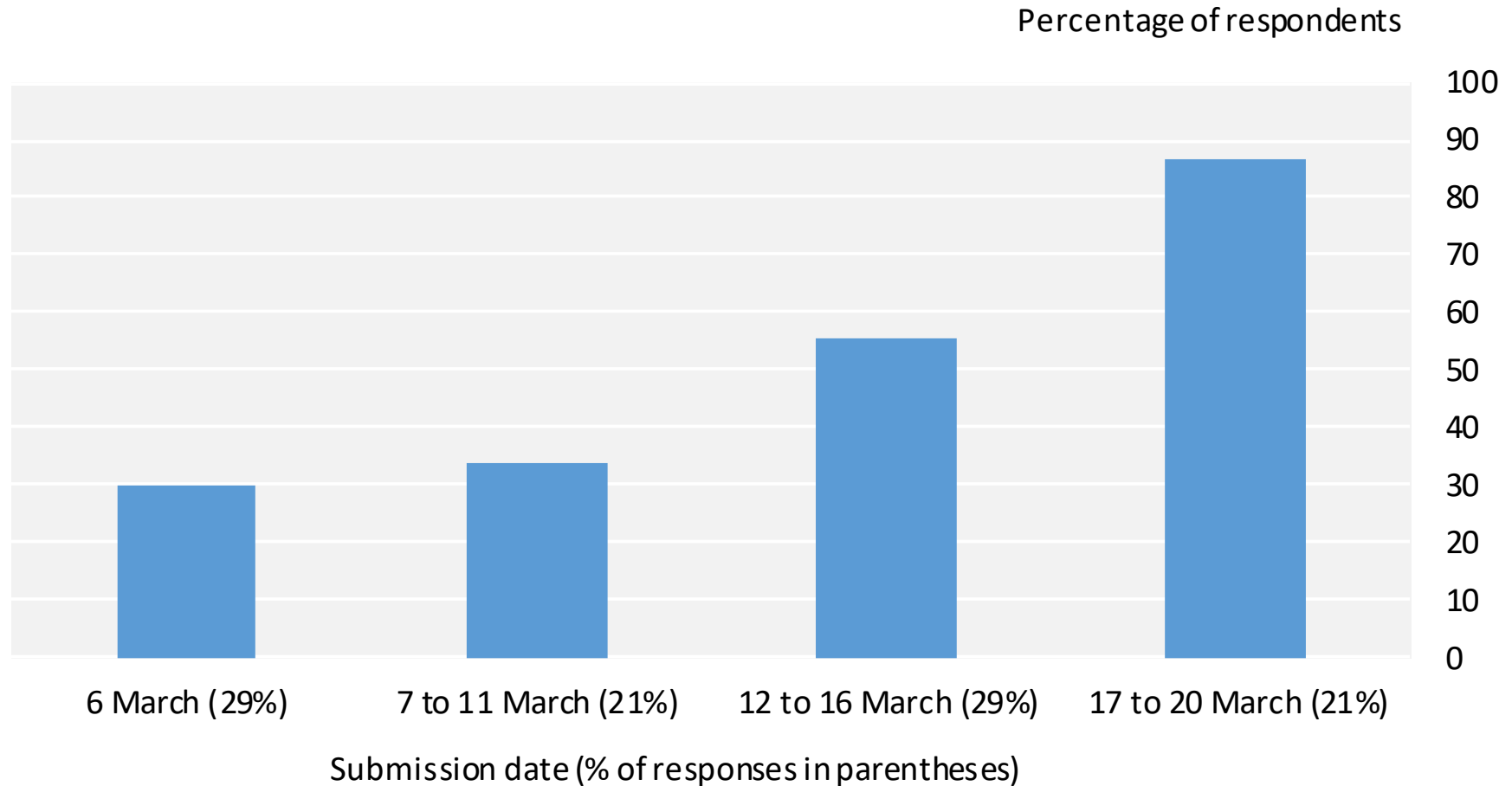
	(1) Activity Weighted	(2) Reweighted
Full Sample [S.E.] (# responses)	-6.5% [0.37] (391)	-6.1% [0.41] (391)
1st Week, Mar 9-13 [S.E.] (# responses)	-5.5% [0.33] (329)	-4.9% [0.32] (329)
2nd Week, Mar 14-20 [S.E.] (# responses)	-11.4% [1.32] (62)	-13.7% [1.77] (62)

Note: Standard errors in brackets and number of responses in parentheses. Column (1) reports activity-weighted means in the SBU sample. Column 2 reports means after further weighting the sample observations to match the one-digit industry distribution of private sector gross output. According to the BEA, gross output is, "principally, a measure of an industry's sales or receipts ... [and capture] an industry's sales to consumers and other final users (found in GDP), as well as sales to other industries (intermediate inputs not counted in GDP). They reflect the full value of the supply chain by including the business-to-business spending necessary to produce goods and services and deliver them to final consumers."

Source: Authors' calculations using the Survey of Business Uncertainty (SBU) conducted by the Atlanta Fed, Chicago Booth and Stanford. For information about the SBU and analysis of the underlying micro data, see Altig et al. (2020a). This table are reproduced from Altig et al. (2020b).

Figure 4: COVID-Induced Uncertainty Rose Rapidly in March 2020

Percent of U.K. firms reporting Covid-19 as the top source of uncertainty, as of survey submission date in March 2020

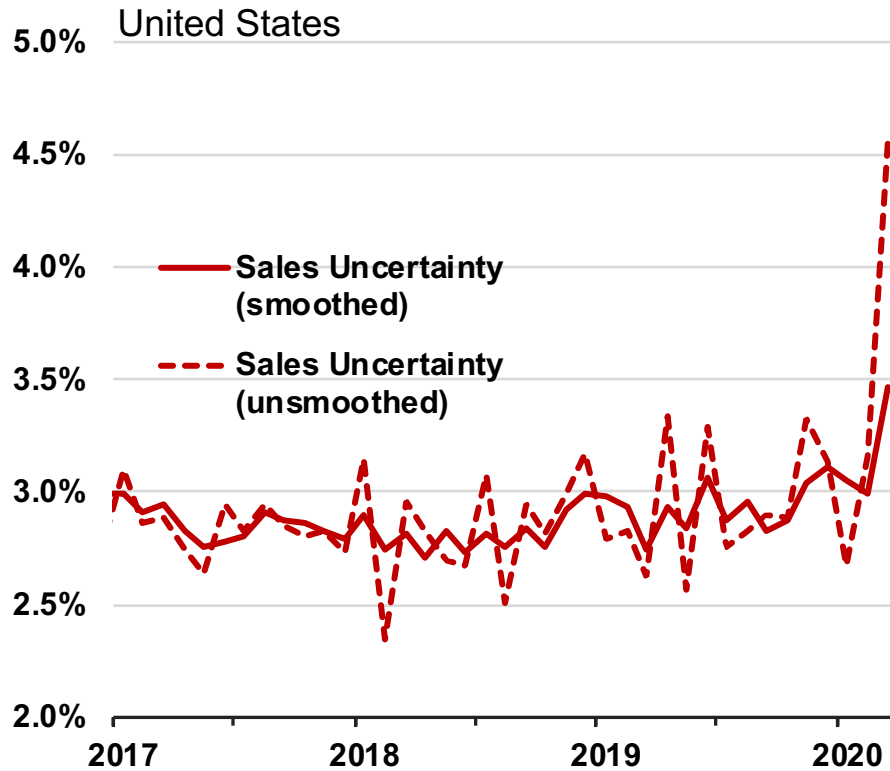


Source: Decision Maker Panel Survey conducted by the Bank of England, Nottingham University and Stanford University and Bloom et al. (2019) and www.decisionmakerpanel.com

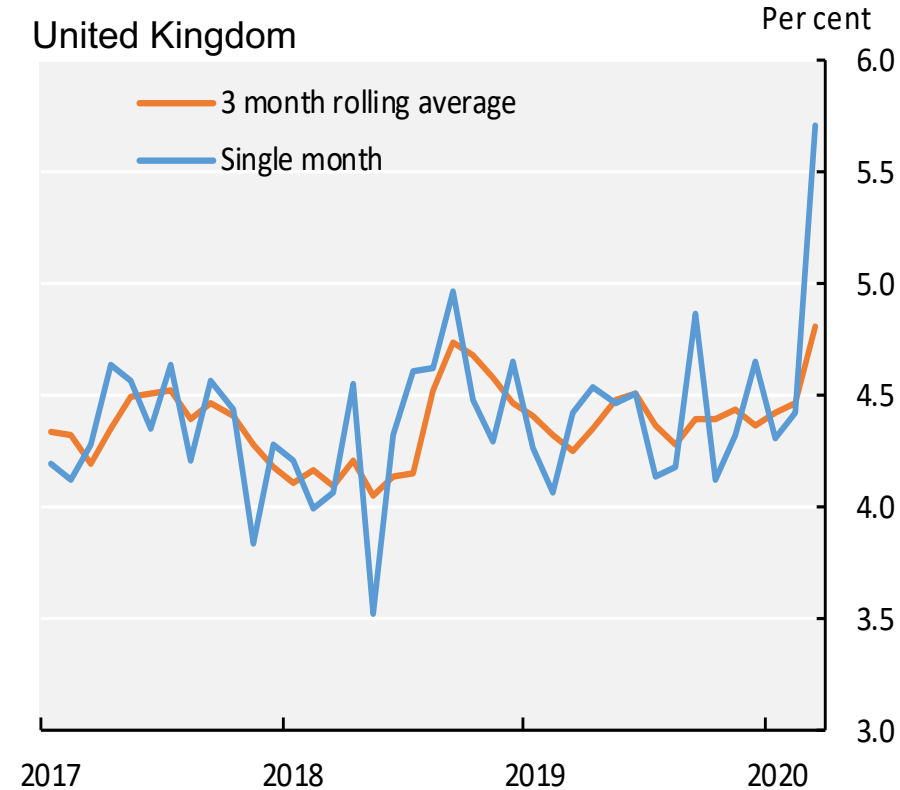
Covid-Induced Economic Uncertainty

Drawing on Altig et al. (2020c), Baker, Bloom and Davis (2016), Bloom et al. (2019) and Davis (2016)

Figure 3: Survey-Based Measures of Uncertainty about Sales Growth Rates at a Four-Quarter Look-Ahead Horizon for the United States and United Kingdom, Monthly from January 2017 to March 2020.

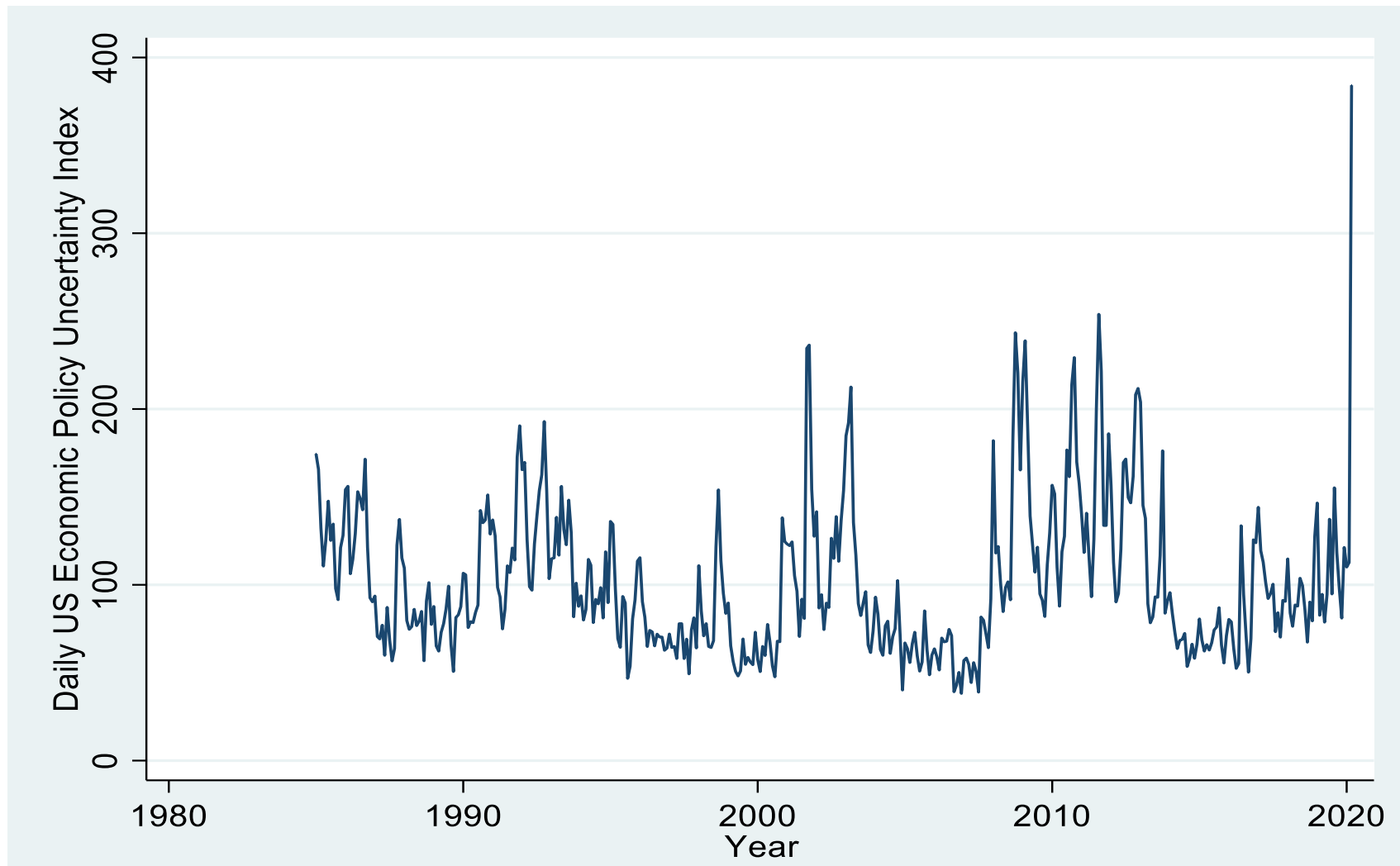


Source: Altig et al. (2020b), using data from the Survey of Business Uncertainty conducted by the Federal Reserve Bank of Atlanta, Stanford University, and the University of Chicago Booth School of Business. For a detailed description of the Survey of Business Uncertainty, see Altig et al. (2020s) and <https://www.frbatlanta.org/research/surveys/business-uncertainty>



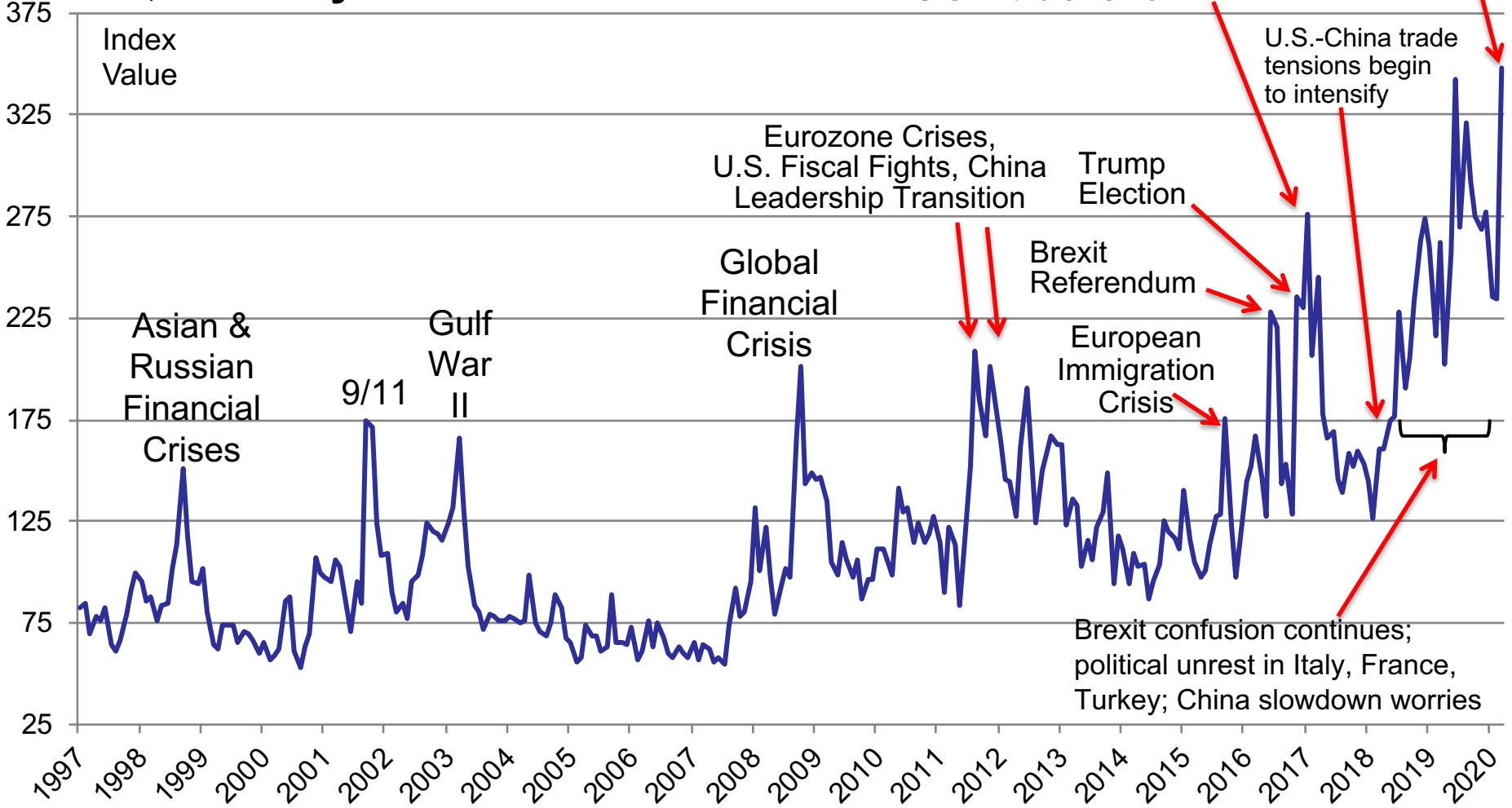
Source: Decision Maker Panel Survey conducted by the Bank of England, Nottingham University and Stanford University. For details and background, see Bloom et al. (2019) and www.decisionmakerpanel.com

Figure 2: U.S. Economic Policy Uncertainty Index, Monthly Averages of Daily Index Values, January 1985 to March 2020








Notes: Daily index values downloaded from www.policyuncertainty.com/media/All_Daily_Policy_Data.csv. See Baker, Bloom and Davis (2016) for details of index construction. We plot data from 1 January 1985 to 31 March 2020.

Global Economic Policy Uncertainty Index, January 1997 to March 2020



Notes: Using data for 21 countries that account for 80% of global GDP at current prices. Normalized to 100 from 1997 to 2015. Sources: Baker, Bloom and Davis (2016), Davis (2016) and PolicyUncertainty.com. See Davis (2016) for details of index construction.

Table 1: Measures of Macro Uncertainty for the United States for the COVID-19 Crisis

Measure	Examples	Frequency	Time lag (days)	Forward Looking	Additional details	Fit for Real-Time COVID-19 Analysis
Financial Volatility	VIX, Realized Volatility (daily or intraday)	Daily	0	Yes	Implied vol available for horizons of 1 month to 10 years	
Newspaper-Based	EPU or EMV	Daily	1	Yes	Categorical detail	
Surveys of Business Expectations	DMP, SBU	Monthly	14	Yes	Sectoral, regional and firm-size	
Surveys of Professional Forecasters	SPF Disagreement	Quarterly	30	Yes	Multiple outcome variables (GDP, employment etc)	
Time-Series Models	GDP Garch JLN Macro	Monthly	60	No	Multiple outcome variables (GDP, employment etc)	

Notes: Frequency and time-lag refers to the most frequent and rapidly produced indicator amongst the examples. Forward looking means the measure at least partly reflects anticipations of future developments rather than historical data. EPU is the Economic Policy Uncertainty index of Baker, Bloom and Davis (2016), and EMV is the Equity Market Volatility Tracker of Baker, Bloom, Davis and Kost (2019). Both are available in daily and monthly versions. DMP is the U.K. Decision Maker Panel described in Bloom et al. (2019), and SBU is the U.S. Survey of Business Uncertainty described in Altig et al. (2020b). SPF is the Philadelphia Fed’s Survey of Professional Forecasters described in Croushore and Stark (2019). JLN Macro refers to the forecast uncertainty measures based on time-series models developed by Jurado, Ludvigson and Ng (2015).

Covid-19 as a Reallocation Shock

Drawing on Leatherby and Gelles (2020) and Altig et al. (2020c)

Anecdotal Evidence

Wall Street Journal, 29 March 2020

Coronavirus Pandemic Compels Historic Labor Shift

Outbreak reshapes job market as some sectors shut down, others see demand surge

“... big companies that have seen pandemic-fueled spikes in demand, including Walmart Inc. and CVS Health Corp, are [seeking nearly 500,000 new staff members in the coming weeks.](#)”

Financial Times, 6 April 2020

Uber starts listing other jobs for its drivers

Ride-hailing app will list job openings at 7-Eleven, Amazon and McDonald's

Wall Street Journal, 13 April 2020

Large Tech Companies Hunt for Talent

Pandemic sets off search for software engineers, scientists at Apple, Google

Anecdotal Evidence, 2

Survey of Business Uncertainty, March 2020

- Among SBU panel members with at least 100 employees that anticipate, as of mid-March, a positive impact of coronavirus developments on their 2020 sales revenue, we find a paper mill that produces packaging materials, a manufacturer of specialty frozen foods, a manufacturer of precision turned products (e.g., computer numerically controlled lathes), a manufacturer of surface active agents, and a large dry cleaning and laundry services firm.

Medical Economics, 18 March 2020

Coronavirus offers opportunity for physicians to try telemedicine

- Even if a shift to telemedicine has little net impact on the demand for medical services, some physician practices and medical clinics will respond adroitly, and many will not. There is potential for large reallocation across practices and clinics.

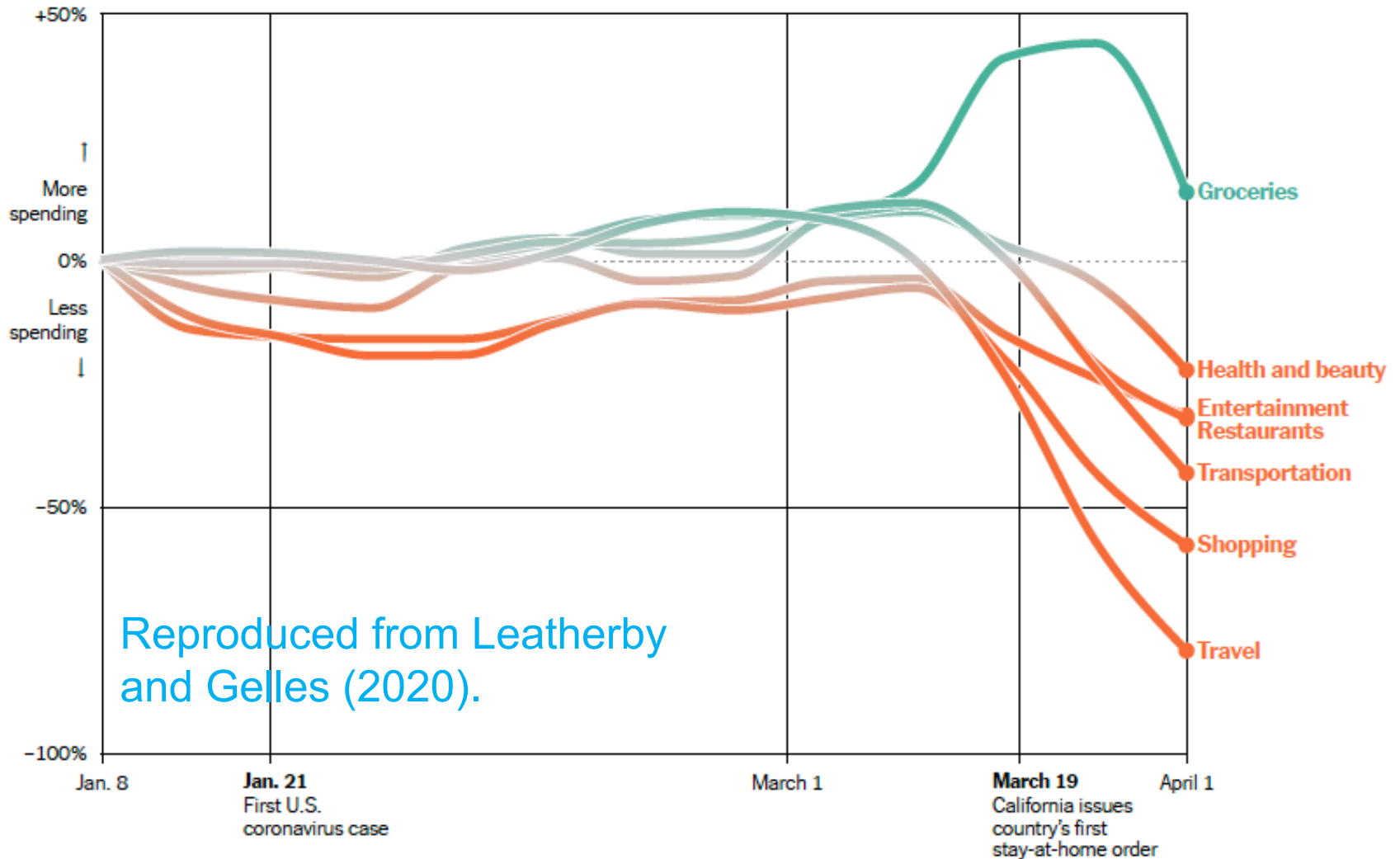
Systematic Evidence

The next few slides provide systematic evidence that the pandemic caused a reallocation shock:

1. Dramatic shift in consumer spending patterns in the wake of the pandemic
2. New business formation continues even now
3. Expected rate of sales reallocation across firms rose sharply in the wake of the pandemic
4. Equity return dispersion among U.S. listed firms rose sharply in reaction to the pandemic

How the Virus Transformed the Way Americans Spend Their Money

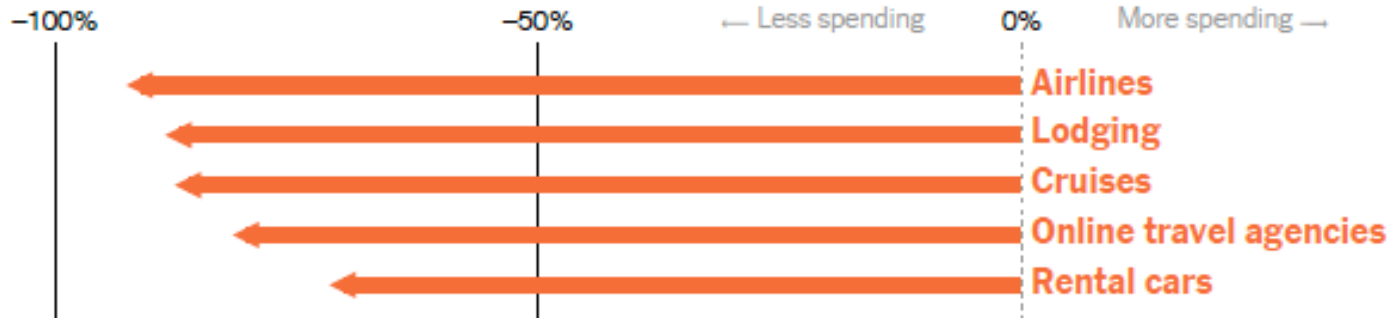
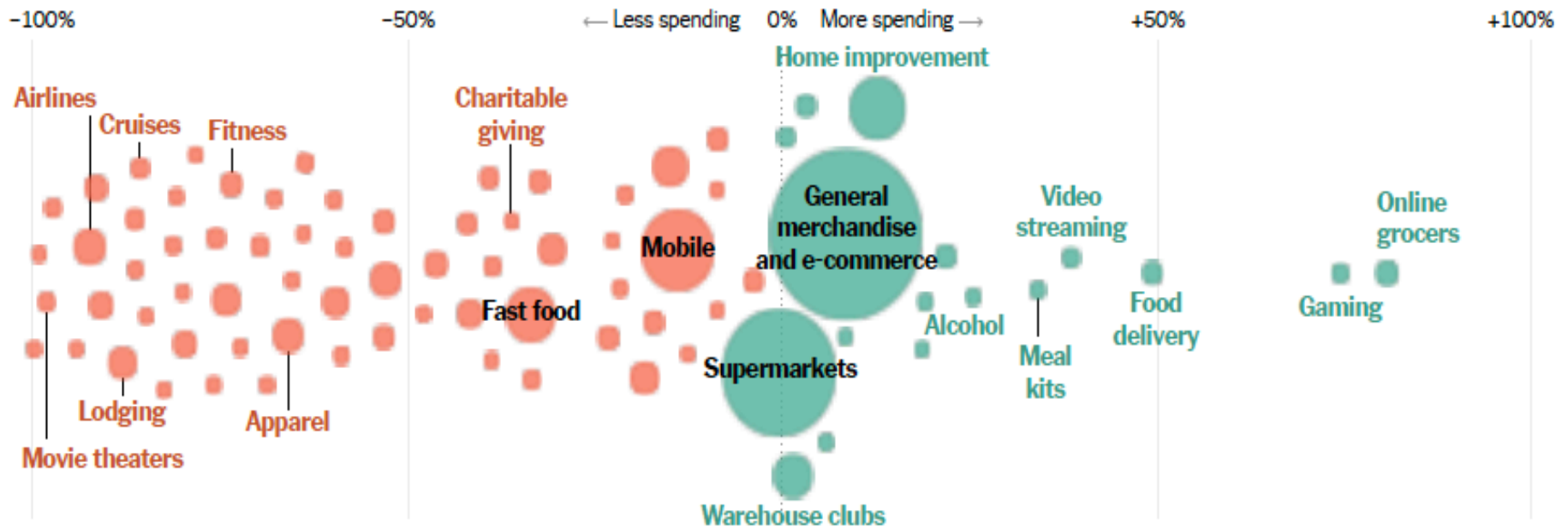
Change in credit and debit card spending



Reproduced from Leatherby and Gelles (2020).

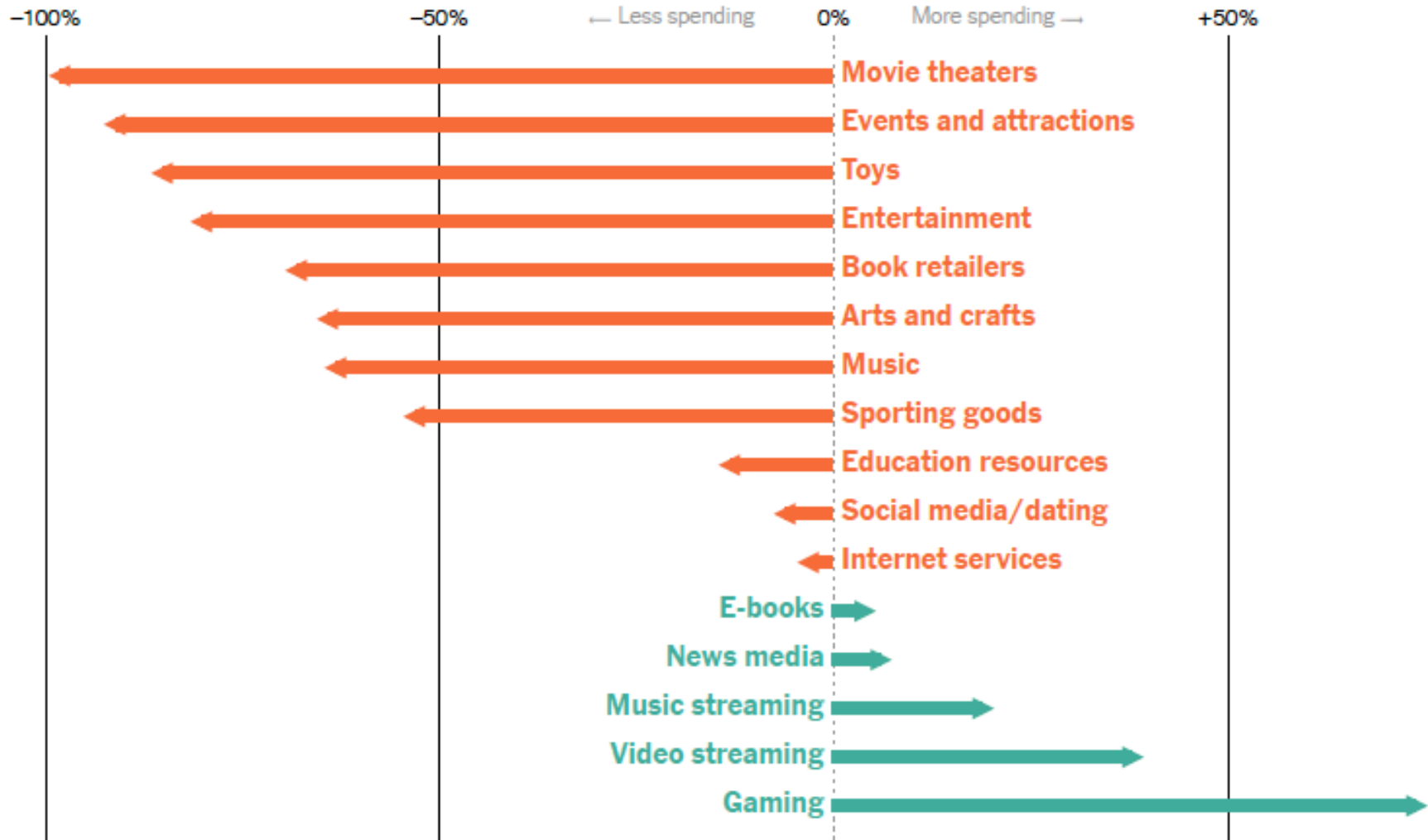
The chart shows the percentage change in spending from the beginning of the year. Each line is an average of the previous two weeks, which smooths out weekly anomalies. | Source: Earnest Research

How the Virus Transformed the Way Americans Spend Their Money



Reproduced from Leatherby and Gelles (2020).

How the Virus Transformed the Way Americans Spend Their Money



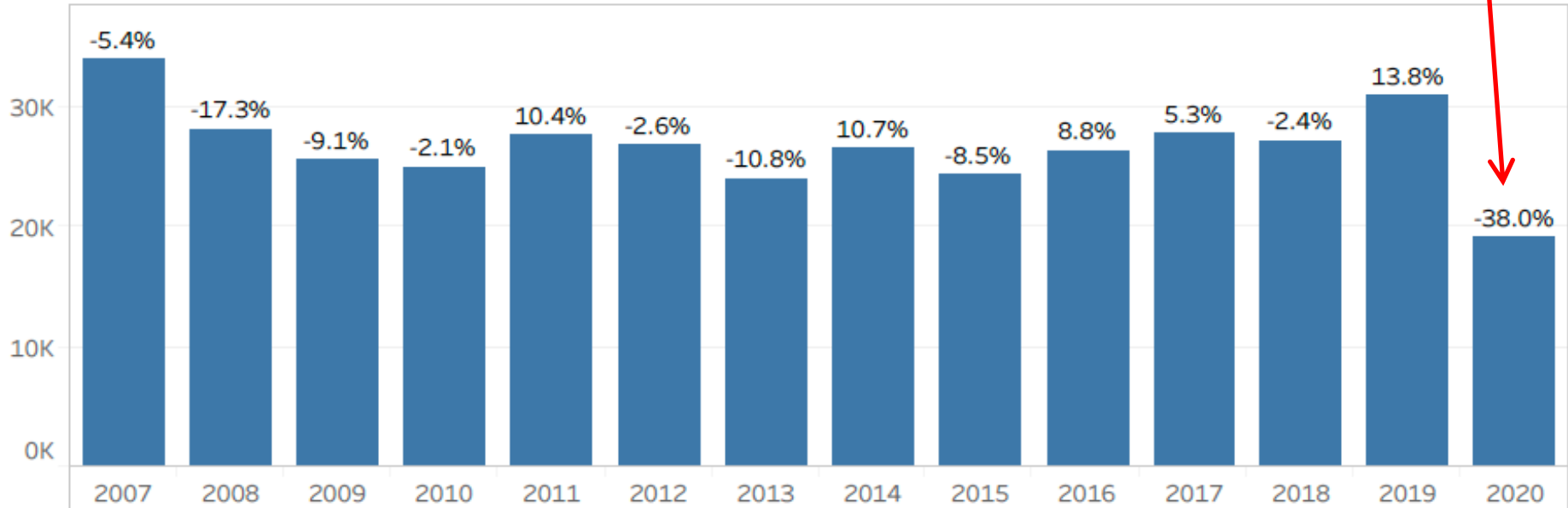
Change in spending from 2019 for the week ending April 1.

Reproduced from Leatherby and Gelles (2020).

New Business Formation Continues, Even Now

Week ending 4 April 2020

High-Propensity Business Applications with Year-to-Year Percent Change: Week 14



Note: Week 53 figures are excluded from visualization.

K=thousands

Source: [Weekly Business Formation Statistics](#), U.S. Census Bureau.

Notes: The weekly BFS derives from IRS administrative data on applications for an Employer Identification Number (EIN) via IRS Form SS-4. **High-Propensity Business Applications** have a high propensity of becoming businesses with payroll based on the characteristics of applications revealed on form SS-4. They include applications: (a) from a corporate entity, (b) that indicate they are hiring employees, purchasing a business or changing organizational type, (c) that provide a first wages-paid date (planned wages); or (d) that have a NAICS industry code in manufacturing (31-33), retail stores (44), health care (62), or restaurants/food service (72).²⁷

Forward-Looking Measures of Reallocation

The next slide shows two monthly series: the aggregate expected sales growth rate (slide 16) and the expected excess reallocation rate of sales across firms. We construct these series by aggregating over SBU data on firm-level expected sales growth rates over the next four quarters.

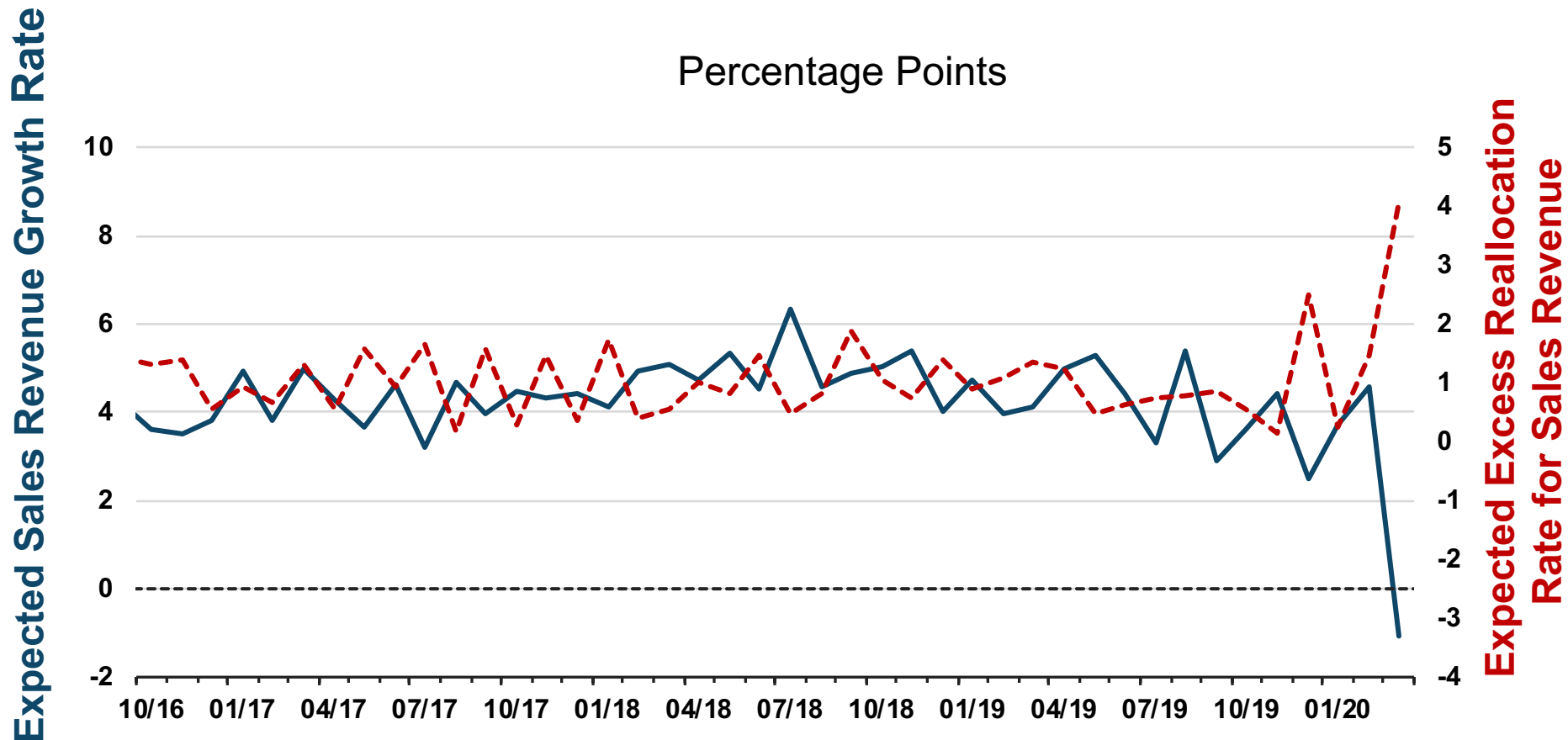
Our measure of the expected reallocation rate of sales is the forward-looking counterpart to the backward-looking excess job reallocation rate considered by Dunne, Roberts and Samuelson (1989) and Davis and Haltiwanger (1992). Many later researchers consider backward-looking measures of reallocation for job flows, bank lending, physical capital, sales, consumer products, export products, business credit, and federal funds. See Altig et al. (2020c) for references.

We compute the forward-looking excess sales reallocation rate as:

$$\begin{aligned} & \text{Gross expected sales growth rate among firms that expect to grow } \mathbf{plus} \\ & \text{Gross expected sales loss rate among firms that expect to shrink } \mathbf{minus} \\ & | \text{Net expected sales growth rate among all firms} | \end{aligned}$$

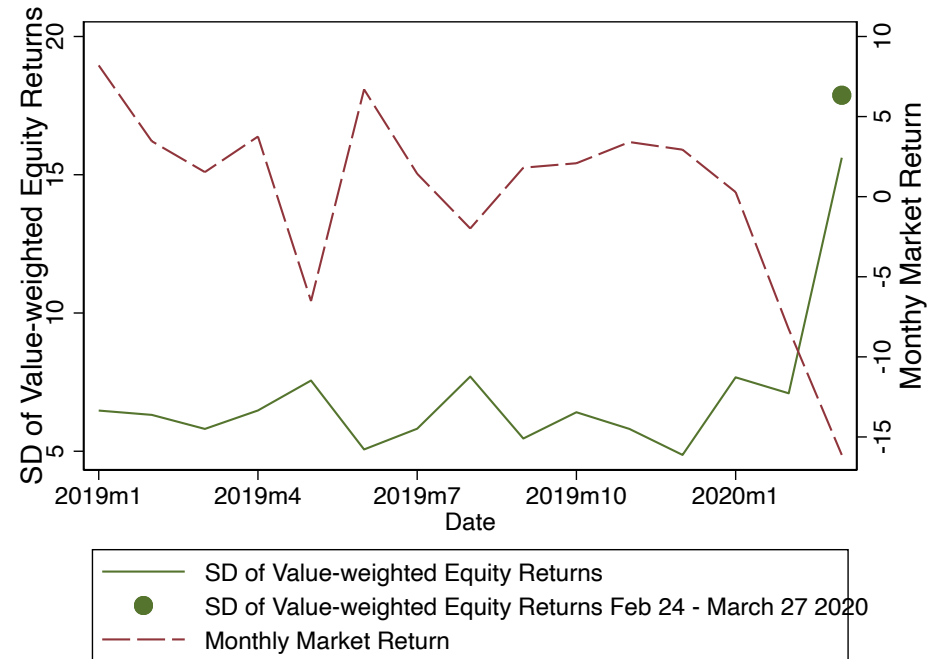
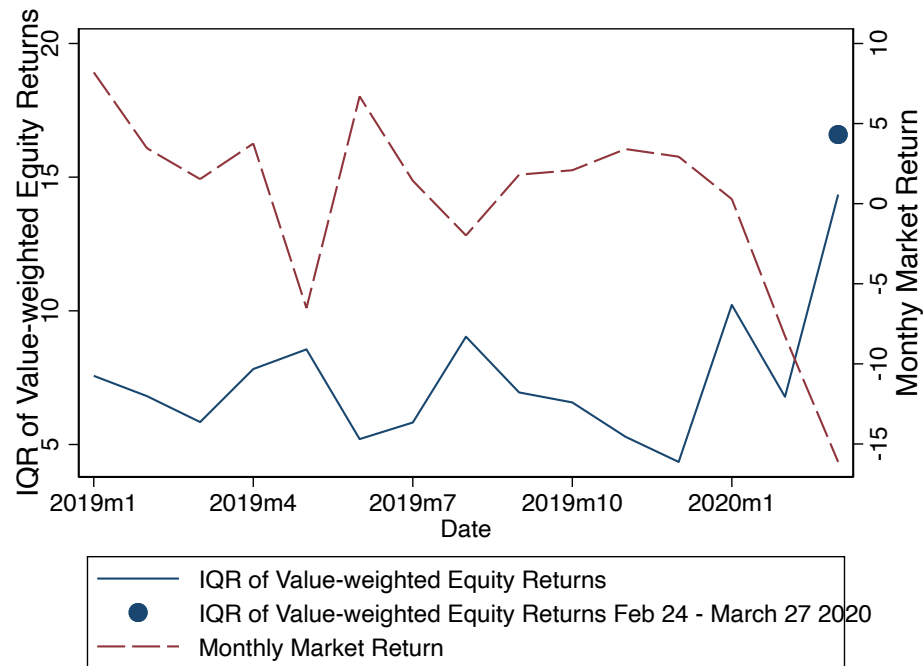
Our forward-looking reallocation measure is probably biased downward because (a) highly stressed firms are less likely to respond to surveys, (b) we under sample younger firms, which we know have **much** higher reallocation rates, and (c) we cannot sample firms that will enter in the next year.

Exhibit 3. Expected Sales Growth and Excess Reallocation Rates at a Four-Quarter Forecast Horizon, October 2016 to March 2020



Source: Survey of Business Uncertainty conducted by the Federal Reserve Bank of Atlanta, Stanford University, and the University of Chicago Booth School of Business. For more information, see “Surveying Business Uncertainty” by David Altig, Jose Maria Barrero, Nick Bloom, Steven J. Davis, Brent Meyer and Nick Parker, NBER Working Paper No. 25956, March 2020. Forthcoming, *Journal of Econometrics*.

Mean and Dispersion of Monthly U.S. Equity Returns, January 2019 to March 2020



Notes: We consider common equity securities traded on the NYSE, AMEX and NASDAQ with share prices quoted in U.S. Dollars that we can match to Compustat. Returns for month t computed as log changes using closing prices on the last trading days in months $t-1$ and t with adjustments for dividends, share repurchases, stock splits and reverse splits except for the green dots, which reflect log changes from 24 February to 27 March 2020. All time-series statistics are computed for the value-weighted distribution of firm-level returns.

Additional Observations

- If pandemics become a recurring phenomenon, we can anticipate significant population shifts away from dense urban areas.
- Even if those shifts are largely limited to retirees, the well off, and those who can work remotely, it would involve large-scale spatial reallocation of businesses, jobs, workers, and capital.
- Davis and Haltiwanger (2001) study the reallocative impact of oil price shocks across industries and employers. Key message: The creation side of reallocation lags the destruction side by 1-2 years.
- Many forces are likely at work in this lag: time to plan new enterprises and business activities, time to navigate regulatory hurdles and permitting processes to start new businesses and expand existing ones, time-to-build in capital formation, uncertainties that lead to delays in making sunk investments, search and matching frictions. Policies that deter or slow the factor reallocation are likely to further lengthen the lag of creation behind destruction, slowing the overall recovery from the pandemic, the lockdown, and the pandemic-induced reallocation shock.

Policy Impediments to Reallocation

There are many, but four come quickly to mind:

1. Overly generous unemployment benefit levels under the CARES Act.
2. Policies that encourage employee retention irrespective of the employer's medium-term business outlook.
3. State-level occupational licensing restrictions.
4. Regulatory barriers to business formation and expansion.

On CARES Act Unemployment Benefit Levels

- “Under the new expansion, the average replacement rate across states would increase to roughly 116 percent. That is, an average worker could earn 16 percentage points more by collecting unemployment than he would on the job.... The expanded benefits exceed 90 percent of the average weekly wages in all states; they exceed 120 percent of average in 21 states and 130 percent in six states.” (Williams, 2020)
- “We estimate that 64 percent of workers (and at least 50 percent in every state except DC) would receive more from UI benefits than from working until the end of July when the \$600 federal supplement expires.” (Personal communication from CEA staff member)
- “Executive Chairman Harvey Spevak had a surprising message to stakeholders. “We believe most will be better off receiving government assistance during our closure,” ... Equinox joins a number of companies, including Macy’s ... and Steelcase ...that are citing the federal government’s beefed-up unemployment benefits as they furlough or lay off staff amid the coronavirus pandemic. The stimulus package is changing the calculus for some employers, which can now cut payroll costs without feeling they are abandoning their employees.” (WSJ article by Thomas and Cutter (2020). Hat tip to Cochrane (2020))

Policies that encourage employee retention irrespective of the employer's outlook

Wall Street Journal, 13 April 2020

Lawmakers Seek New Ways to Cover Workers' Paychecks During Coronavirus

Plans aim to stem soaring job losses and provide payroll funds for companies hurt by the pandemic

Lead paragraph: "U.S. lawmakers are drawing up proposals for the federal government to guarantee private companies' paychecks during the coronavirus pandemic to arrest soaring job losses, aiming to fill holes in last month's aid package.

... [C]ompanies that shut down or suffer a decline in demand as a result of the pandemic would be eligible to receive money from the government to cover the costs of payroll and related benefits, as well as rent and utilities. Ms. Jayapal, the co-chair of the Congressional Progressive Caucus, which represents nearly 100 House Democrats, is calling for guaranteeing workers' wages for three months, up to an annual salary of \$100,000 a worker. The guarantees would be renewed monthly after that, until a government gauge of consumer spending increases nearly to the level before the pandemic closed big parts of the economy. Some economists are predicting the labor market won't fully recover until 2023.

Occupational Licensing

- The share of workers required to hold a license to do their jobs rose from less than 5% in the 1950s to more than 25% percent by 2008 (Kleiner and Krueger, 2013).
- Licensing rates in the U.S. are now similar to rates in the EU and Japan (Hermansen, 2020).
- Many license are at the state-level and cross-state reciprocity is limited.
- The spread of occupational licensing (Kleiner and Krueger, 2013) inhibits mobility across occupations and states. See, e.g., Carpenter et al. (2012), White House (2015) and Johnson and Kleiner (2017) for evidence.

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